

# Art Design of Non-Heritage Cultural and Creative Products Based on the Concept of Sustainability

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## ABSTRACT

With the continuous development of social economy and the gradual improvement of intangible culture protection system, the express train that integrates intangible culture into cultural and creative products to drive economic development has been on the highway. The integration of the two has become an important direction of traditional art protection and development in the industry and business of intangible cultural protection. From the perspective of sustainable development theory, this paper points out that the designers and developers of cultural and creative products need to take sustainable design as the core theory, organically combine the narrative of consumers with the intangible culture, and give full play to the social, cultural and commercial value of the current sustainable design theory in the visual design of intangible cultural and creative products. Taking the sustainability of ecological design and the sustainability of people-oriented design as the innovative ideas of visual design.

## KEYWORDS

Sustainable Design Theory, Non-Legacy Products, Visual Design

The conclusion of the 2022 Beijing Winter Olympic Games brought attention to South Korea's controversial reentry into the global sporting arena (Handley et al., 2016). It was marked by what has been dubbed its "C debut" (Tiancheng & Tieyi, 2020). In particular, the conduct of South Korean athletes in short-track speed skating has sparked outcry and drawn unsettling parallels to instances of cultural appropriation (Keitsch, 2012; Pizzini et al., 2017). Instances of on-ice violence, illegal maneuvers such as pushing and shoving, and even threats to the safety of fellow competitors have raised concerns about ethical conduct in sports (Wenqing, 2020; Leerberg et al., 2010; Baldassarre et al., 2020). These actions have evoked comparisons to the unethical appropriation of Chinese traditional cultural treasures, highlighting broader issues of cultural integrity and respect (Kuijer & Bakker, 2015).

Intangible cultural heritage has always been an important part of China's excellent traditional culture and an important foundation for strengthening national cultural unity (Kasarda et al., 2007). Strengthening the protection of intangible cultural heritage is of great significance to the inheritance of history, the enhancement of national cultural confidence, the promotion of world cultural exchanges, and the realization of cultural power (Sonogo et al., 2018). Since the 18th National Congress of the Communist Party of China, China's intangible cultural heritage protection has achieved fruitful results (Ray, 2014). In order to further strengthen the protection of intangible cultural heritage, some

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suggestions have been put forward (Gong & You, 2015). First, one should establish and improve the inheritance system of intangible cultural heritage protection (Wakkary et al., 2013). Methods include, for example, perfecting the investigation record system, perfecting the standardized records of investigation and declaration files, strengthening the digital construction of files, and ensuring the safety, appropriateness, and maintenance of physical objects and materials (Cheng et al., 2022; Verhulst & Boks, 2012). Second, one should improve the representative project system (Cheng et al., 2022). We will improve the project directory system based on the division of national administrative units and build a scientific, reasonable, and efficient representative project classification system (Weiss, 2015; Cheng et al., 2022). Third, one should improve the system of non-genetic inheritors (Lowrey & Hou, 2021). This can be done by strengthening the evaluation and dynamic management of inheritors and improving the exit mechanism (Zhang et al., 2021). The central government has also given 20,000 years per person's annual inheritance study subsidy and regularly conducted training courses to enhance and consolidate the inheritors' skills and artistic ability (Zhang et al., 2023).

Against this backdrop, sustainable development has emerged as a guiding principle, emphasizing the imperative of balancing present needs with the conservation of resources for future generations (Kumar, 2023). Within this framework, the intersection of sustainable development and the preservation of intangible cultural heritage holds profound significance when advocating for the safeguarding of traditions and fostering holistic societal progress (Vrdoljak, 2024).

This article explores the symbiotic relationship between sustainable development and the preservation of intangible cultural heritage, with a specific focus on the role of visual design (Scovazzi, 2024). Through an interdisciplinary lens, we delve into how sustainable practices can serve as a guiding framework for the revitalization and transmission of cultural heritage, while simultaneously driving innovation and economic growth within the cultural and creative industries (Szakálné Kanó et al., 2023). Drawing upon insights from cultural studies, environmental sciences, and design theory, we unravel the multifaceted dimensions of sustainable development and its application to non-legacy creative products. By examining case studies and theoretical frameworks, we illuminate pathways for harnessing the adaptive resilience of cultural traditions in an era of rapid change. Ultimately, this article serves as a call to action, advocating for an integrated approach that honors the legacy of the past while embracing the imperatives of the future. By embracing the ethos of sustainable development and leveraging the power of visual design, we aspire to forge a path towards the enduring vitality and relevance of intangible cultural heritage for generations to come.

## **RELATED WORK**

In the 1980s, a new concept, sustainable development, was put forward, which means that meeting the material and spiritual needs of contemporary people will not damage the ability of future generations to meet the same needs (Yan & Feng, 2014; Niinimäki & Koskinen, 2011; Sherwin, 2004; Turner, 2009). In easy-to-understand terms, it means that “you can't eat your ancestors' meals and cut off your children's food” (Klocke & Lein, 2020; Guo, 2021). Intangible cultural heritage is the realistic embodiment of tradition in contemporary life, and it is constantly endowed with the wisdom and creativity of the people (De Eyto et al., 2008; Cucuzzella, 2016). This can also be reflected in the data of nongenetic sowing vitality values of cities in China, as shown in Table 1 below. In addition, sustainable development has three important meanings: (a) It is conducive to promoting the unity of ecological, economic, and social benefits (Skeros et al., 2006); (b) it is conducive to promoting the transformation of economic growth and achieving the goal of economic development in harmony with population and environment (Shi & Chew, 2012; Tang et al., 2016); and it is conducive to the sustained, steady, sound, and upward development of the social economy and improves the quality of people's happy life (Esswein et al., 2011). To sum up, China's intangible cultural heritage needs to take a road of sustainable development (Duke et al., 2018).

Table 1. Data table of urban nongenetic sowing vitality in the first half of 22 years

Month	Average value of urban nongenetic sowing vitality	Last month's growth rate
one	142.61	+17.80%
2	110.23	-22.71%
three	118.73	+7.71%
four	103.33	-14.90%
five	126.83	+22.74%
six	179.36	+41.42%

## MATERIALS AND METHODS

### Sustainable Design Theory

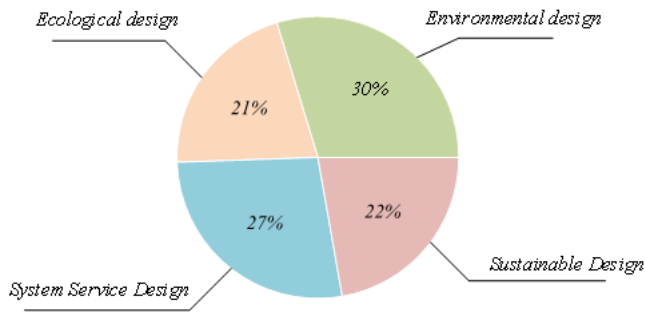
In the preface, the concept of sustainable development is mentioned. DFS (Design for Sustainability) is also a design idea and scientific design method derived from sustainable development (Bui et al., 2023). This design aims to minimize negative environmental impact and maximize positive social and economic benefits. Its emergence is a response to people's increasing awareness of the unsustainability of traditional design practices, which often put short-term benefits above long-term ecological health. At its core, sustainable design seeks to address the interconnectedness of human activities with the natural environment. It acknowledges that human well-being is intricately linked to the health of ecosystems and the equitable distribution of resources. Therefore, sustainable design endeavors to use resources efficiently, reduce waste, and mitigate pollution and environmental degradation.

Sustainable design takes into account a wide range of factors that influence the design process and its outcomes (Xiong & Guangliang, 2023). These factors include:

1. **Natural Environment:** Sustainable design considers the ecological impact of design decisions, such as resource extraction, energy consumption, and waste generation. It seeks to minimize environmental harm by adopting renewable energy sources, reducing carbon emissions, and preserving biodiversity.
2. **Social Systems:** Sustainable design recognizes the importance of social equity and inclusion. It strives to create designs that promote social well-being, cultural diversity, and community resilience. This may involve engaging stakeholders in the design process, addressing social inequalities, and fostering local empowerment.
3. **Human Environment:** Sustainable design prioritizes human health and comfort. It seeks to create spaces that are safe, healthy, and conducive to well-being. This includes considerations such as indoor air quality, thermal comfort, noise reduction, and access to natural light and green spaces.
4. **Economic Development:** Sustainable design aims to create value while minimizing costs and resource consumption. It explores innovative business models, such as circular economy principles, to optimize resource use, reduce waste, and enhance economic resilience.

At present, sustainable design can be roughly divided into four stages: green design, ecological design, system service design, and sustainable design. 51% of the existing designs in China are green design and ecological design. On the other hand, there is still much room for improvement in the proportion of sustainable design, as shown in Figure 1 below. Figure 1 also shows that the theory and practice of sustainable design are parallel, since they are processes of continuous progress, exploration, improvement, and optimization.

Figure 1. Four stages of sustainable design



### Research Status of Sustainable Design Theory

In 1992, Erfurt University of Technology established a research center for environmental protection products; Massachusetts Institute of Technology (MIT) in the United States has also carried out a large number of social practice explorations in the social application of sustainable solutions and information technology, and they made a wide range of attempts in urban construction with the theme of “interconnection,” “convenience,” and “sustainable development” (de Oliveira et al., 2023). Dr. Aizo Manzini of Milan Polytechnic University founded the international university alliance of “Social Innovation and Sustainable Design,” widely publicized the concept of sustainable design based on social innovation, and participated in and led many sustainable design schemes and related teaching activities. Comparatively speaking, the research and teaching discussion on sustainable design in China are late, and there is little practice and research based on the theory of sustainable design. Generally, foreign countries focus on the concept and promotion of sustainable design due to their rich experience, since sustainable design takes a long time to study (Lucchi, 2023).

In 2001, Hong Kong Polytechnic University and Guangzhou Academy of Fine Arts, led by Tsinghua University, founded the first sustainable design workshop in China, which was the first strategic meeting between Chinese design circles and universities on the sustainable level. Professor Liang of Hong Kong Polytechnic University put forward the sustainable design strategy of “culture-oriented, linked with ecology” and pointed out that we should popularize the concept of sustainable design in China, so that the domestic design circles can accept this “advanced” concept. From the perspective of culture, the whole process of communication, integration, absorption, and innovation is carried out. Professor Liu from Tsinghua University said that domestic design friends need to shift the focus of the design of a single “object” to the design of the whole system.

The research status of sustainable design theory reflects both international trends and the unique context of China's development. While Western countries have a longer history of research and practice in sustainable design, China is rapidly catching up and making significant strides in integrating sustainability principles into its design education and practice. Collaboration between academia, industry, and government will be essential to advance sustainable design initiatives in China and contribute to global efforts towards a more sustainable future. While there have been significant advancements in sustainable design theory and practice both internationally and within China, there are still challenges to overcome. These include the need for greater interdisciplinary collaboration, continued innovation, and the adoption of holistic approaches to sustainability. By addressing these challenges and fostering collaboration and capacity building, both internationally and within China, the field of sustainable design can make further strides towards creating a more resilient, equitable, and sustainable future for all.

Table 2. Data sheet of commonly used firebrick

Category	Thermal conductivity	Refractoriness
clay brick	0.8	580~1750C
high alumina brick	0.3-0.5	1420~ 1550C
Clay insulating brick	0.8	1200~ 1400C
Mullite lightweight brick	0.45	1350~1700C

## Application of Sustainable Development Theory in Industrial Design

Domestic architectural circles have also made efforts in sustainable design. For example, when building, the natural lighting, ventilation, and other effects of future buildings should be fully considered, and certain new energy technologies such as solar energy should be applied. The abuse of air conditioning is one of the important reasons for global warming. The industry has used certain technical means to convert solar energy into other energy sources to realize self-supply of summer energy and storage of surplus energy. Another application of sustainable design theory is the organic combination of architecture, climate, and terrain. This can effectively realize natural lighting to make up for the problem of artificial lighting and save energy. Another is ventilation. The flow of natural wind can be effectively controlled by matching shutters and airflow windows, which will allow for a more comfortable living experience.

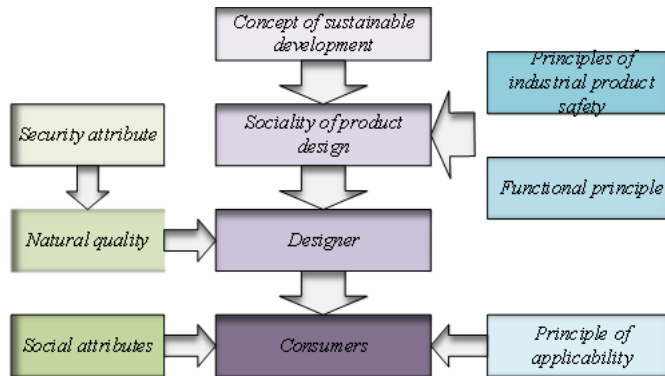
In sustainable design, one should adopt scientific building peripheral materials, reduce energy consumption, and push the utilization rate of energy to the extreme. In addition to the old-fashioned thermal insulation wall, both sides of the wall should be covered with glass. Through the reserved gap between them, solar energy will be left between the glass and the wall by internal refraction after passing through the glass layer, thus achieving energy storage.

For the sustainable design and application of roofs, scientific and environment-friendly thermal insulation materials such as glass wool, mineral wool, or aerated concrete thermal insulation block are adopted. These materials have common characteristics: light bulk density, high thermal insulation performance, good sound absorption effect, and certain strength for secondary processing. Their main raw materials are mostly inorganic. Therefore, they have good fire resistance and do not emit harmful gases in case of fire. The fire resistance is 650 degrees, which is a first-class refractory material. The fire resistance of 90mm thick wall reaches 245min, and that of 300mm thick wall reaches 520min, which is the best among refractory bricks (see Table 2 below). They have seismic resistance, which is two seismic levels higher than that of clay brick. They are also durable, and the strength of the material is stable. After one year's exposure to the atmosphere, the strength of the specimen is improved by 25%, and it remains stable after 10 years.

One can also apply sustainable design to the production of industrial products. At present, there are many kinds of industrial products in the market. With the support of the theory of sustainable development, major enterprises begin to reduce waste, which reduces production costs and meets the requirements of the scientific development concept. Through analysis of the industrial product production system based on the concept of sustainable design, the principle of industrial production after integrating the concepts is also shown in Figure 2.

The application of sustainable development theory in industrial design encompasses a range of strategies aimed at enhancing environmental performance, energy efficiency, and resource conservation. By integrating sustainable design principles into architectural design and industrial production, stakeholders can create buildings and products that are not only aesthetically pleasing but also environmentally responsible and socially beneficial. These efforts contribute to the advancement of sustainability goals and the creation of a more resilient and sustainable future for all.

Figure 2. Production principles of sustainable development of industrial products



## THE VISUAL DESIGN OF NON-LEGACY CREATIVE PRODUCTS OF SUSTAINABLE DESIGN THEORY

### The Role of Visual Design in Product Promotion

Visual design is a means and way of expression for the visual function of eyes, mainly including the design of signs, packaging, fonts, images, books, advertisements, decoration, and interfaces. With the continuous development of the design industry, visual design is very important for enterprises to spread their business philosophy, build their own brand image, and establish their popularity. It can show a company's brand image and product characteristics. As far as a complete brand building system is concerned, it should be the core part of serving the brand strategy, the external embodiment of brand standardization, and one of the methods for consumers to authenticate their identity. Its functions are describes in this section.

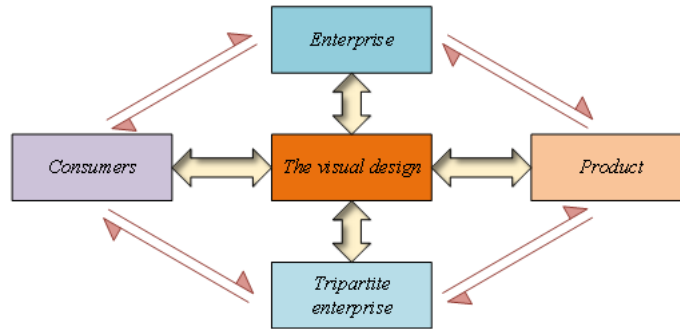
Visual design serves as a versatile and expressive medium for conveying a company's brand identity and values. Through elements such as logos, color schemes, typography, and imagery, visual design communicates the essence of a brand to consumers. By creating visually appealing and cohesive brand assets, such as packaging designs and advertisements, companies can establish a strong and recognizable brand presence in the minds of consumers. This helps to differentiate their products from competitors and build brand loyalty.

Visual design research can better convey the efficiency and concision of modern commercial services. For example, for the design of a corporate logo and corporate office environment are all passed on to viewers through the most intuitive visual images, so visual design bridges the gap between enterprises, third-party enterprises, products, and consumers (as shown in Figure 3 below). By creating visually cohesive branding materials, companies can effectively communicate their brand identity and values to their target audience. From corporate logos and office environments to product packaging and promotional materials, visual design acts as a conduit for connecting businesses with consumers. It helps to establish a sense of trust, familiarity, and recognition, making it easier for consumers to engage with and purchase products.

Packaging design is a key component of visual design in product promotion. Beyond its primary function of protecting products during transportation and storage, packaging serves as a powerful sales tool. Well-designed packaging captures the attention of consumers on store shelves, communicates product benefits and features, and influences purchasing decisions. Eye-catching packaging designs can evoke positive emotions, create a sense of anticipation, and ultimately drive sales.

Visual design plays a multifaceted role in product promotion, serving as both a creative expression of brand identity and a strategic tool for driving consumer engagement and sales. By investing in visually compelling branding materials and packaging designs, companies can effectively communicate

Figure 3. The bridge function of visual design



their brand message, differentiate themselves from competitors, and create meaningful connections with consumers. Ultimately, visual design enhances the overall consumer experience and contributes to the success of product promotion efforts.

### Present Situation of Visual Design of Non-Legacy Creative Products

Tiantan Fuyin Coffee exemplifies the integration of traditional Beijing culture into a contemporary product. By infusing almond milk unique to old Beijing and chocolate chips with auspicious symbols, the coffee offers a taste experience that resonates with the cultural heritage of the city. The visual design of the coffee cup further enhances the cultural connection, featuring iconic landmarks like the Hall of Prayer for Good Harvests and symbols of blessings. The use of a red color scheme, reminiscent of traditional Chinese aesthetics, adds depth to the product's visual appeal and cultural significance.

The collaboration between the New Tianlong Babu game and cultural institutions like the Yanmenguan Scenic Area and Henan Radio and TV station's "Fantastic Tour of Tanabata" program demonstrates a concerted effort to promote traditional culture through modern mediums. By incorporating elements of traditional festivals and intangible cultural heritage into gameplay, these initiatives offer players immersive experiences that celebrate and preserve cultural traditions in contemporary contexts. The integration of Wuju Opera and exploration of historical sites like the Great Wall enrich players' understanding of traditional culture while fostering engagement and appreciation. It adheres to the mission of carrying forward traditional culture. Now, take the traditional Wu drama as the carrier to reproduce the strange fate of the turbulent period in the bonfire. It incorporates the most touching love between Mu Guiying and Yang Zongbao in the Northern Song Dynasty into the game, and launches a brand-new fashion: Xuanjia Danchuan and other series of limited and exquisite antique costumes (as shown in Figure 4 below).

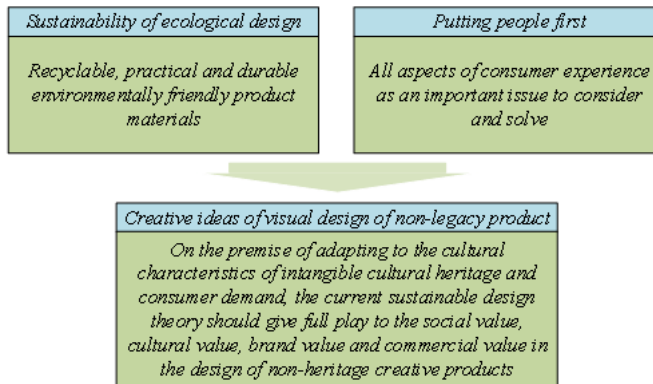
The creation of non-legacy products inspired by the Beijing Winter Olympics exemplifies the fusion of traditional craftsmanship with modern design sensibilities. "Cloisonne and Hetian jade curling" showcases the integration of traditional techniques like cloisonne making and Beijing jade carving with contemporary product concepts. Through meticulous craftsmanship and symbolic designs, these products pay homage to both the Olympic spirit and Chinese cultural heritage. By using materials like Hetian jade stone and incorporating intricate patterns, these products convey a sense of luxury and cultural significance while promoting ice and snow sports and celebrating Beijing's cultural legacy.

Contemporary product design illustrates the various ways in which visual design is used to bridge the gap between tradition and modernity in non-legacy creative products. By drawing inspiration from cultural heritage, these products not only provide a unique consumption experience but also help to protect and promote traditional culture in contemporary society. Through thoughtful design

Figure 4. Present situation of visual design of non-legacy creative products



Figure 5. Innovative ideas of visual design of non-legacy creative products based on sustainable design theory



and storytelling, intangible products become the carrier of cultural expression, participation, and celebration, ensuring the continued prosperity and development of cultural heritage in the digital age.

## RESULT ANALYSIS

### Innovative Ideas of Visual Design of Non-Legacy Creative Products Based on Sustainable Design Theory

At present, sustainable design has formed a certain atmosphere in its application scope, but there is still much room for improvement in the safety and utilization rate of practical materials. Therefore, it is necessary to think deeply about ecological design and sustainable innovation of people-oriented design in the visual design of non-legacy products. The design ideas obtained by combining ecological design sustainability and people-oriented design sustainability are shown in Figure 5 below.

#### Sustainability of Ecological Design

Ecological design itself accounts for 21% of the share of sustainable design, and it is also one of the core competitive features of sustainable design applied to non-legacy products. Based on analysis of current social development, the popularity of recyclable, practical, and durable environment-friendly materials is much higher than that of disposable materials, and people have gradually developed health



concerns about disposable materials. People will instinctively feel that using disposable materials will do harm to their own health and even the environment.

## People-Oriented Design Sustainability

As mentioned in “Sustainable Design Theory,” most of us have the “reputation” of “Appearance Association” at present, which is actually the way people express and release their innermost feelings with the development and progress of society. Therefore, at the design level of non-legacy creative products, it is necessary to consider and solve all aspects of consumers' experiences as pain points.

In the R&D team of ByteDance, the user experience of products is the point of most concern for the senior management of the project after every demand is put forward. The top management will consider whether the pain points of users are met and solved, what the significance of the products is, and whether the feelings of users can be expressed in the process of product development. In fact, this is also an issue to which the visual design of non-legacy creative products needs to pay attention. Instinctively speaking, consumers' performance is reflected in their senses and visual perception. We can pay attention to the shape, color, material, and other aspects of non-legacy products to bring better visual impact effect to users. From the behavioral point of view, consumers' physiological (behavioral feelings) and psychological feelings in the process of using products are the key to determine whether users are willing to do free word-of-mouth marketing and secondary consumption. We need to improve the reuse frequency of the product itself and attach the product to some functional values, including but not limited to combining human mechanics and ergonomics to make the product more humanized, safe, and personalized. People-oriented design sustainability focuses on meeting the needs and preferences of users while considering their overall well-being and experience. This approach involves creating products that are not only functional but also emotionally engaging and user-friendly. Visual design plays a crucial role in enhancing the user experience by creating aesthetically pleasing and intuitive interfaces, packaging, and branding elements. Designers can use color psychology, typography, and graphic elements to evoke positive emotions and convey brand values. Moreover, incorporating user feedback and usability testing into the design process ensures that products are tailored to meet the specific needs and preferences of the target audience. This iterative approach fosters continuous improvement and innovation in product design.

## Implementation Strategies

It is useful to collaborate with suppliers and manufacturers to source eco-friendly materials and adopt sustainable production processes. This may involve conducting lifecycle assessments to evaluate the environmental impact of materials and manufacturing methods. One can also integrate sustainable design principles into the entire product lifecycle, from sourcing and production to distribution and end-of-life disposal. Designers can explore concepts such as circular design, which focuses on minimizing waste and maximizing resource efficiency. They can educate consumers about the environmental benefits of sustainable products and empower them to make informed purchasing decisions. Clear labeling and communication of sustainability features can help consumers understand the eco-friendly attributes of the product. Engaging with stakeholders, including industry associations, NGOs, and government agencies, helps when advocating for sustainable design practices and policy changes which support environmental conservation and consumer well-being.

Innovative visual design of non-legacy creative products based on sustainable design theory requires a holistic approach which considers ecological, social, and economic factors. By prioritizing eco-friendly materials, user-centric design principles, and collaborative partnerships, designers can create products that not only minimize environmental impact but also enhance user satisfaction and well-being.

## CASE STUDY

### Sustainable Design in Traditional Textiles

In the Himalayan region of India, traditional handloom weaving has been a significant part of the local culture for centuries. However, with the advent of industrialization and modernization, the demand for traditional textiles has declined, leading to economic challenges for local artisans. To address this issue, a nonprofit organization partnered with local weavers to revitalize traditional handloom weaving through sustainable design practices. They introduced eco-friendly dyes made from natural ingredients such as indigo, turmeric, and madder root, reducing the environmental impact of textile production. Additionally, they incorporated traditional motifs and patterns into modern designs, preserving cultural heritage while appealing to contemporary consumers. Through sustainable design interventions, the project not only revived interest in traditional textiles but also provided economic opportunities for local artisans. By embracing sustainable practices, the artisans were able to differentiate their products in the market, attracting eco-conscious consumers and fostering a sense of pride in their cultural heritage.

### Digital Preservation of Indigenous Knowledge

In Australia, Indigenous communities have a rich oral tradition comprising stories, songs, and ceremonies which are passed down through generations. However, there is a risk of this intangible cultural heritage being lost due to factors such as urbanization, cultural assimilation, and language loss. To preserve and promote Indigenous knowledge, a collaborative project was initiated to develop a digital platform for recording and sharing oral histories. Indigenous elders were trained to use digital recording equipment and software to document their cultural practices, ensuring that traditional knowledge was preserved in a digital format. The digital preservation project empowered Indigenous communities to take ownership of their cultural heritage and share it with wider audiences. By incorporating sustainable design principles such as community engagement and capacity building, the project facilitated intergenerational knowledge transfer and contributed to the preservation of Indigenous culture for future generations.

### Sustainable Tourism in Cultural Landscapes

In Peru, the Sacred Valley of the Incas is a UNESCO World Heritage site renowned for its rich cultural heritage and stunning natural landscapes. However, unregulated tourism and development pose threats to the preservation of the valley's cultural and ecological integrity. To promote sustainable tourism in the Sacred Valley, a local conservation organization collaborated with Indigenous communities to develop eco-friendly tourism initiatives. This included the creation of hiking trails that highlighted cultural landmarks and provided opportunities for visitors to engage with local artisans and learn about traditional practices such as pottery and weaving. Through sustainable tourism initiatives, the project generated income for Indigenous communities while promoting the conservation of cultural and natural resources. By incorporating principles of sustainable design into tourism development, the project ensured that economic benefits were balanced with environmental and cultural preservation, creating a model for responsible tourism in culturally significant landscapes.

These case studies demonstrate the diverse applications of sustainable design in preserving and promoting intangible cultural heritage, highlighting the importance of innovative approaches to safeguarding cultural traditions for future generations.

## CONCLUSION

In conclusion, this article has delved into the symbiotic relationship between sustainable development and the preservation of intangible cultural heritage, with a specific focus on the role of visual design in fostering this connection. Through an interdisciplinary lens, we have explored

how sustainable practices can serve as a guiding framework for revitalizing cultural traditions while driving innovation and economic growth within the cultural and creative industries. By integrating intangible cultural heritage into cultural and creative products, we not only re-inherit our rich cultural legacy but also facilitate its dissemination to wider audiences. Through the lens of sustainable design theory, we have highlighted the importance of adopting eco-friendly materials and people-centric design principles in creating products that resonate with consumers while minimizing environmental impact. The application of sustainable visual design principles offers a transformative pathway for enterprises to harness the social, cultural, and commercial value inherent in intangible cultural heritage. By embracing sustainable design, enterprises can effectively transform intangible cultural heritage into marketable products while ensuring its long-term preservation and promotion. Looking ahead, it is imperative to continue exploring the potential challenges and opportunities in this field, including the potential negative impacts of non-legacy cultural products on intangible heritage. By addressing these challenges and implementing practical solutions, we can achieve genuine sustainable development which honors cultural heritage, fosters economic prosperity, and ensures a vibrant cultural landscape for generations to come.

In the future, comprehensive research should be carried out to understand the potential negative impact of intangible cultural products on intangible heritage. This may involve analyzing the ways in which commercialization and mass production may dilute the authenticity or integrity of cultural traditions. Future research should also explore the potential of digital technology in the protection and promotion of intangible cultural heritage, such as augmented reality (AR) and virtual reality (VR). It should also develop innovative digital platforms and experiences to allow users to interact with cultural traditions in an immersive and fascinating way. By focusing on these research directions and practical applications, we can advance the sustainable preservation and promotion of intangible cultural heritage while fostering innovation and economic growth in the cultural and creative industries.

## **DATA AVAILABILITY**

The figures and tables used to support the findings of this study are included in the article.

## **CONFLICTS OF INTEREST**

The authors declare that they have no conflicts of interest.

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## REFERENCES

- Baldassarre, B., Keskin, D., Diehl, J. C., Bocken, N., & Calabretta, G. (2020). Implementing sustainable design theory in business practice: A call to action. *Journal of Cleaner Production*, 273, 123113. 10.1016/j.jclepro.2020.123113
- Bui, T., Ngo, T., & Dang, P. (2023). Visual communication design and sustainability: Reflections from a pilot course with design for sustainability methods and tools. In *Proceedings of INTED2023* (pp. 7624-7633). IATED. 10.21125/inted.2023.2085
- Cheng, H., Ma, P., Dong, G., Zhang, S., Wei, J., & Qin, Q. (2022a). Characteristics of carboniferous volcanic reservoirs in Beisantai Oilfield, Junggar Basin. *Mathematical Problems in Engineering*, 2022, 1–10. 10.1155/2022/7800630
- Cheng, H., Wei, J., & Cheng, Z. (2022b). Study on sedimentary facies and reservoir characteristics of Paleogene sandstone in Yingmaili block, Tarim basin. *Geofluids*, 2022, 1–14. 10.1155/2022/7447423
- Cheng, H., Yang, D., Lu, C., Qin, Q., & Cadasse, D. (2022c). Intelligent oil production stratified water injection technology. *Wireless Communications and Mobile Computing*, 2022, 1–7. 10.1155/2022/3954446
- Cucuzzella, C. (2016). Creativity, sustainable design and risk management. *Journal of Cleaner Production*, 135, 1548–1558. 10.1016/j.jclepro.2015.12.076
- De Eyto, A., Mc Mahon, M., Hadfield, M., & Hutchings, M. (2008). Strategies for developing sustainable design practice for students and SME professionals. *European Journal of Engineering Education*, 33(3), 331–342. 10.1080/03043790802088681
- de Oliveira, R. T., Ghobakhloo, M., & Figueira, S. (2023). Industry 4.0 towards social and environmental sustainability in multinationals: Enabling circular economy, organizational social practices, and corporate purpose. *Journal of Cleaner Production*, 430, 139712. 10.1016/j.jclepro.2023.139712
- Duke, S. O., Rimando, A. M., Reddy, K. N., Cizdziel, J. V., Bellaloui, N., Shaw, D. R., Williams, M. M.II, & Maul, J. E. (2018). Lack of transgene and glyphosate effects on yield, and mineral and amino acid content of glyphosate-resistant soybean. *Pest Management Science*, 74(5), 1166–1173. 10.1002/ps.462528547884
- Esswein, A. J., Surendranath, Y., Reece, S. Y., & Nocera, D. G. (2011). Highly active cobalt phosphate and borate based oxygen evolving catalysts operating in neutral and natural waters. *Energy & Environmental Science*, 2(2), 499–504. 10.1039/C0EE00518E
- Gong, J., & You, F. (2015). Sustainable design and synthesis of energy systems. *Current Opinion in Chemical Engineering*, 10, 77–86. 10.1016/j.coche.2015.09.001
- Guo, H. (2021). The application of psychological cognitive preference in intangible cultural heritage experience design under the background of cultural and creative industry. *Psychiatria Danubina*, 33, 15–15.
- Handley, H. A., Amisshah, M., Heimerdinger, D., & Vance, E. (2016). Non legacy viewpoint for Department of Defense architecture framework architectures. *The Journal of Defense Modeling and Simulation*, 13(4), 415–429. 10.1177/1548512915606239
- Kasarda, M. E., Terpenney, J. P., Inman, D., Precoda, K. R., Jelesko, J., Sahin, A., & Park, J. (2007). Design for adaptability—A new concept for achieving sustainable design. *Robotics and Computer-integrated Manufacturing*, 23(6), 727–734. 10.1016/j.rcim.2007.02.004
- Keitsch, M. (2012). Sustainable design: A brief appraisal of its main concepts. *Sustainable Development (Bradford)*, 20(3), 180–188. 10.1002/sd.1534
- Klocke, C., & Lein, P. J. (2020). Evidence implicating non-dioxin-like congeners as the key mediators of polychlorinated biphenyl developmental neurotoxicity. *International Journal of Molecular Sciences*, 21(3), 1013. 10.3390/ijms2103101332033061
- Kuijjer, L., & Bakker, C. (2015). Of chalk and cheese: Behaviour change and practice theory in sustainable design. *International Journal of Sustainable Engineering*, 8(3), 219–230. 10.1080/19397038.2015.1011729
- Kumar, N. (2023). The conservation of natural resources: Meaning and philosophy. *Academic Discourse*, 12(1), 59–76.

- Leerberg, M., Riisberg, V., & Boutrup, J. (2010). Design responsibility and sustainable design as reflective practice: An educational challenge. *Sustainable Development (Bradford)*, 18(5), 306–317. 10.1002/sd.481
- Lowrey, W., & Hou, J. (2021). All forest, no trees? Data journalism and the construction of abstract categories. *Journalism*, 22(1), 35–51. 10.1177/1464884918767577
- Lucchi, E. (2023). Regenerative design of archaeological sites: A Pedagogical approach to boost environmental sustainability and social engagement. *Sustainability (Basel)*, 15(4), 3783. 10.3390/su15043783
- Niinimäki, K., & Koskinen, I. (2011). I love this dress, it makes me feel beautiful! Empathic knowledge in sustainable design. *The Design Journal*, 14(2), 165–186. 10.2752/175630611X12984592779962
- Pizzini, S., Sbicco, C., Corami, F., Grotti, M., Magi, E., Bonato, T., Cozzi, G., Barbante, C., & Piazza, R. (2017). 3, 3'-dichlorobiphenyl as a marker of non-legacy PCB contamination in marine species: Comparison between Antarctic and Mediterranean bivalves. *Chemosphere*, 175, 28–35. 10.1016/j.chemosphere.2017.02.02328211332
- Ray, A. (2014). Cutting fluid selection for sustainable design for manufacturing: An integrated theory. *Procedia Materials Science*, 6, 450–459. 10.1016/j.mspro.2014.07.058
- Sherwin, C. (2004). Design and sustainability: A discussion paper based on personal experience and observations. *The Journal of Sustainable Product Design*, 4(1-4), 21–31. 10.1007/s10970-006-0003-x
- Shi, L., & Chew, M. Y. L. (2012). A review on sustainable design of renewable energy systems. *Renewable & Sustainable Energy Reviews*, 16(1), 192–207. 10.1016/j.rser.2011.07.147
- Skerlos, S. J., Morrow, W. R., & Michalek, J. J. (2006). Sustainable design engineering and science: Selected challenges and case studies. In Abraham, M. (Ed.), *Sustainability science and engineering (Vol. 1)*, pp. 467–515). Elsevier.
- Sonego, M., Echeveste, M. E. S., & Debarba, H. G. (2018). The role of modularity in sustainable design: A systematic review. *Journal of Cleaner Production*, 176, 196–209. 10.1016/j.jclepro.2017.12.106
- Szakálné Kanó, I., Vas, Z., & Klasová, S. (2023). Emerging synergies in innovation systems: Creative industries in Central Europe. *Journal of the Knowledge Economy*, 14(1), 450–471. 10.1007/s13132-021-00879-7
- Tang, Y., Yang, S., & Zhao, Y. F. (2016). Sustainable design for additive manufacturing through functionality integration and part consolidation. In Muthu, S. S., & Savalani, M. M. (Eds.), *Handbook of sustainability in additive manufacturing (Vol. 1)*, pp. 101–144). Springer. 10.1007/978-981-10-0549-7\_6
- Tiancheng, Z., & Tieyi, C. (2020). The preliminary study on the application of modern advanced processing technique in non-legacy cultural and creative product design—Taking Wuhu iron painting as an example. In E3S Web of Conferences, 179, 02091. 10.1051/e3sconf/202017902091
- Turner, S. (2009). ASIT—A problem solving strategy for education and eco-friendly sustainable design. *International Journal of Technology and Design Education*, 19(2), 221–235. 10.1007/s10798-008-9080-6
- Verhulst, E., & Boks, C. (2012). The role of human factors in the adoption of sustainable design criteria in business: Evidence from Belgian and Dutch case studies. *International Journal of Innovation and Sustainable Development*, 6(2), 146–163. 10.1504/IJISD.2012.046943
- Vrdoljak, A. F. (2024). The principle of sustainable development and international cultural heritage law. In Pineschi, L. (Ed.), *Cultural heritage, sustainable development and human rights* (pp. 15–45). Routledge.
- Wakkary, R., Desjardins, A., Hauser, S., & Maestri, L. (2013). A sustainable design fiction: Green practices. *ACM Transactions on Computer-Human Interaction*, 20(4), 1–34. 10.1145/2494265
- Weiss, A. S. (2015). The digital and social media journalist: A comparative analysis of journalists in Argentina, Brazil, Colombia, Mexico, and Peru. *The International Communication Gazette*, 77(1), 74–101. 10.1177/1748048514556985
- Wenqing, L. (2020). Suggestions on innovative design of hakka needlecraft arts and cultural creative products. E3S Web of Conferences, 189, 03010.

Xiong, C., & Guangliang, S. (2023). A study of Chinese residents participating in design for sustainability in the context of carbon neutrality. In *Proceedings of Service Design and Innovation Conference* (pp. 833-854). 10.3384/ecp203044

Yan, J., & Feng, C. (2014). Sustainable design-oriented product modularity combined with 6R concept: A case study of rotor laboratory bench. *Clean Technologies and Environmental Policy*, 16(1), 95–109. 10.1007/s10098-013-0597-3

Zhang, J., Cai, X., & Zhan, Z. (2023). Reflections on establishing a system for cultivating intangible cultural heritage inheritors in the new era: Based on the survey in fujian province. *Sustainability (Basel)*, 15(11), 9088. 10.3390/su15119088

Zhang, W., Cheng, Z., Cheng, H., Qin, Q., & Wang, M. (2021, July). Research of tight gas reservoir simulation technology. In *Proceedings of IOP Conference Series: Earth and Environmental Science*. IOP Publishing. School of Fine Arts, Jiangxi Science and Technology Normal University, Nanchang Nanchang330008, China School of fine arts, Central China Normal University 10.1088/1755-1315/804/2/022046